Review 4 Rules for Derivatives

1. $\frac{d}{dx} x^n = nx^{n-1}$

2. $\frac{d}{dx} c \cdot f(x) = c \cdot f'(x)$

3. $\frac{d}{dx} c = 0$

4. $\frac{d}{dx}\left[f(x) + g(x)\right] = f'(x) + g'(x)$

$\frac{d}{dx}\left(8x^3 - 3x^2 + 7x + 4\right) = 24x^2 - 6x + 7$

Feb 22-10:35 AM

5. $\frac{d}{dx} \sin x = \cos x$

6. $\frac{d}{dx} \cos x = -\sin x$

7. $\frac{d}{dx} \tan x = \sec^2 x$

8. $\frac{d}{dx} \cot x = -\csc^2 x$

9. $\frac{d}{dx} \sec x = \sec x \tan x$

10. $\frac{d}{dx} \csc x = -\csc x \cot x$

Feb 22-10:39 AM

11. $\frac{d}{dx}\left[f(x) \cdot g(x)\right] = f(x)\, g'(x) + g(x)\, f'(x)$

12. $\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{g(x)\, f'(x) - f(x)\, g'(x)}{(g(x))^2}$

$\frac{d}{dx}\left(\frac{x^2 \sin x}{2x+1}\right) = \frac{(2x+1)\left[x^2 \cdot \cos x + \sin x \cdot 2x\right] - x^2 \sin x \cdot 2}{(2x+1)^2}$

Feb 22-10:42 AM

13. $\frac{d}{dx} \sin^{-1} x = \frac{1}{\sqrt{1-x^2}}$

14. $\frac{d}{dx} \tan^{-1} x = \frac{1}{x^2+1}$

15. $\frac{d}{dx} \sec^{-1} x = \frac{1}{|x|\sqrt{x^2-1}}$

16. $\frac{d}{dx} e^x = e^x$

17. $\frac{d}{dx} a^x = a^x \cdot \ln a$

18. $\frac{d}{dx} \ln x = \frac{1}{x}$

19. $\frac{d}{dx} \log_a x = \frac{1}{x \ln a}$

Feb 22-10:45 AM

20 $\frac{d}{dx} f(g(x)) = g'(x)\ f'(g(x))$

$\frac{d}{dx} 3^{\sin(2x)} = 2\cdot\cos(2x)\cdot 3^{\sin(2x)}\cdot \ln 3$

$\frac{d}{dx} \tan\sqrt{2x+1} = 2\cdot\frac{1}{2}(2x+1)^{-\frac{1}{2}}\cdot \sec^2\sqrt{2x+1}$

x	f(x)	g(x)	f'(x)	g'(x)
2	8	3	1/3	-3
3	3	-4	2π	5

$\frac{d}{dx}\left[f(g(x))\right]\Big|_{x=2} = g'(2)\cdot f'(g(2))$

$-3\cdot f'(3)$

$-3\cdot 2\pi = -6\pi$

Feb 22-10:49 AM

21. if f & g are inverse functions

$g'(x) = \frac{1}{f'(g(x))}$

Feb 22-10:57 AM